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10/816,378	04/01/2004	Chung-Chieh Lee	1014-080US01/JNP-0335	9360

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EXAMINER	
CHU, WUTCHUNG	

ART UNIT	PAPER NUMBER
2619	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/816,378	LEE, CHUNG-CHIEH	
	Examiner	Art Unit	
	WUTCHUNG CHU	2619	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 May 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,5-25,28-30,34-54 and 58-78* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,5-25,28-30,34-54 and 58-78* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This communication is in response to application's amendment filed on 5/21/2008. Claims 1, 5-25, 28-30, 34-54, and 58-78 are pending, claims 76-78 are newly added, claims 2-4, 26-27, 31-33, and 55-57.

Claim Rejections - 35 USC § 103

2. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1, 8-19, 21-25, 28-30, 37-48, 50-54, 61-64, 66-78 are rejected under 35 U.S.C. 103(a) as being unpatentable over St. John (US2002/0136200) in view of Dan et al., hereinafter Dan, (US6047309)

Regarding claims 1, 25, and 30, St. John discloses methods, systems and computer program products for bandwidth allocation in a multiple access

system **(see St. John paragraph 5)** program code **(see St. John paragraph 22)** comprising:

- A control unit **(see St. John paragraph 31)** that stores packets from a variable number of service flows to one of a static number of hold queues **(see St. John figure 2 QoS Queues)**
- storing a packet to one of a plurality of hold queues **(see paragraph 5 packets enqueue in the plurality of queues and figure 2 QoS 0 Queue)**;
- monitoring a loading condition of a transmit queue **(see paragraph 39 quantum value of a queue is updated)** by monitoring an amount of data residing within the transmit queue **(see paragraph 39 the packets in that queue may be serviced by first placing them in the output queue)**;
- transferring the packet from the one of the plurality of hold queues to a transmit queue **(see paragraph 30)** for delivery to a network device via a downstream channel in response to the time epoch **(see paragraph 8)**.

St. John discloses all the subject matter of the claimed invention with the exception of:

- generating a time epoch based on the loading condition by (i) computing a transmission time to deliver the amount of data in the transmit queue, (ii) computing a system load in units of time by comparing the transmission time to a constant lower limit and

selectively setting the system load based on the comparison, and (iii) computing the time epoch based on the system load and a previous time epoch; and

Dan from the same or similar fields of endeavor teaches the use of:

- load timestamp is the server generated time stamp of the time at which the load was reported **(see Dan col. 3 lines 53-65)**,
- server utilization measured as the number o requests served per unit time **(see Dan col. 3 lines 53-65)**, and
- observed delay of the last response from that server, the delay timestamp containing the time at which the delay was observed **(see Dan col. 3 lines 53-65)**.
- Comparison of load timestamp from table U and table S and the server load in table S is set to the value of server load in table U **(see Dan col. 5 lines 7-14 as corresponds to comparing the transmission time to a constant lower limit and selectively setting the system load based on the comparison, since the term a constant lower limit is not further specified therefore it is broadly interpreted and in this case it is being compared with another table)**.

Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the generating timestamp as taught by Dan in the systems and computer program products for bandwidth allocation in a multiple access system of St. John in order to enhance system efficiency.

Regarding claims 8, 28, and 37, St. John teaches further comprising:

- associating the packet with a service flow **(see paragraph 30)**;
- identifying a service credit associated with the service flow, wherein the service

  credit represents a bandwidth allocation available for consumption by the service flow **(see paragraph 32 quantum value)**; and
- assigning the packet to one of the plurality of hold queues based on the identified service credit **(see paragraph 32)**.

Regarding claims 9 and 38, St. John teaches assigning the packet comprises assigning an initial packet associated with the service flow to the transmit queue **(see paragraph 30)**.

Regarding claims 10 and 39, St. John teaches assigning the packet comprises:

- identifying a target queue state associated with the service flow, wherein the target queue state specifies a current priority level associated with the service flow **(see paragraph 32 quantum value)**; and
- selecting the one of the plurality of hold queues based on the target queue state **(see paragraph 32)**.

Regarding claims 11 and 40, St. John teaches assigning the packet comprises:

- comparing the service credit to the size of the packet **(see St. John paragraph 40)**; and
- selectively assigning the packet to the one of the plurality of hold queues based on the comparison **(see St. John paragraphs 40 and 41)**.

Regarding claims 12 and 41, St. John teaches selectively assigning the packet comprises assigning the packet to the one of the plurality of hold queues when the service credit is greater than or equal to the size of the packet **(see St. John paragraph 41)**.

Regarding claims 13 and 42, St. John teaches adjusting the service credit by substracting the size of the packet from the service credit **(see St. John paragraph 51).**

Regarding claims 14 and 43, St. John teaches selectively assigning the packet comprises:

- comparing the service credit to the size of the packet **(see St. John paragraph 40)**; and
- selecting a different one of the plurality of hold queues when the service credit is less than the size of the packet **(see St. John paragraph 52 and figure 4 block 475)**.

Regarding claims 15 and 44, St. John teaches selecting a different one of the plurality of hold queues comprises:

- adjusting the service credit; and selecting the different one of the hold queues based on the adjusted service credit **(see St. John paragraph 52 and figure 4 block 475)**.

Regarding claims 16 and 45, St. John teaches adjusting the service credit **(see St. John paragraph 52 and figure 4 block 475)** comprises:

- defining a set of configurable service classes **(see St. John paragraph 30 and 32)**;
- pre-computing service quanta for each service class in the set **(see St. John paragraph 58)**, wherein the service quantum represents a pre-computed bandwidth adjustment for different network loading conditions **(see St. John paragraph 55-58)**;
- associating the packet with one of the service classes **(see paragraph 32)**;
- selecting one of the pre-computed service quanta based on the one of the service classes associated with the packet and a current network loading condition **(see St. John paragraph 30-32)**; and

- adjusting the service credit based on the selected one of the pre-computed service quanta **(see St. John paragraph 49, 56, and 58)**.

Regarding claims 17 and 46, St. John teaches further comprising:

- Identifying a target queue state associated with the service flow, wherein the target queue state specifies a current priority level associated with the service flow **(see St. John paragraphs 40-41)**;
- Adjusting the target queue state associated with the service flow to demote the target queue state by one or more priority levels **(see St. John paragraph 43 sets the QoS back to zero and begins a new service round)**; and
- Selecting the different one of the plurality of hold queues based on the adjusted target queue state **(see St. John paragraph 52 and figure 4 block 475)**.

Regarding claims 18 and 47, St. John teaches adjusting the target queue state comprises: identifying a service class associated with the packet **(see St. John paragraph 30 and 32)**; monitoring a loading condition of a transmit queue **(see paragraph 39 quantum value of a queue is updated)**; adjusting the service credit based on the determined service class and the monitored loading condition **(see St. John paragraphs 41-43)**; and selecting the different one of the plurality of hold queues based on the adjusted service credit and the adjusted target queue state **(see St. John paragraph 52 and figure 4 block 475)**.

Regarding claims 19 and 48, St. John teaches monitoring a loading condition comprises monitoring the amount of data residing within the transmit queue **(see St. John paragraph 32)**.

Regarding claims 21, 29, and 50, St. John teaches further comprising transmitting the packet from the transmit queue to the network device via the downstream channel **(see St. John paragraph 8)**.

Regarding claims 22 and 51, St. John teaches transmitting the packet comprises assigning a queue state to each one of the plurality of hold queues, wherein the queue state represents a priority level for the respective hold queue **(see St. John paragraphs 30-32)**.

Regarding claims 23 and 52, St. John teaches further comprising reassigning the queue state assigned to each one of the plurality of hold queues in response to the time epoch **(see St. John paragraph 43 sets the QoS back to zero and begins a new service round where new service round corresponds to time epoch)**.

Regarding claims 24 and 53, St. John teaches reassigning the queue state comprises:

- demoting the queue state of the highest priority one of the plurality of hold queues to the queue sate of the lowest priority one of the plurality of hold queue **(see St. John paragraph 43 sets the QoS back to zero and begins a new service round)**, and

- promoting the queue states of the remaining hold queues by a priority level **(see St. John paragraph 43 if queue does not have any packets to send, QoS is set to QoS+1)**.

Regarding claims 54, St. John discloses methods, systems and computer program products for bandwidth allocation in a multiple access system **(see St. John paragraph 5)** program code **(see St. John paragraph 22)** comprising:

- a cable modem **(see St. John paragraph 13)**; and
- a cable modem termination system **(see St. John paragraph 13)** comprising:
- a downstream scheduler that includes a transmit queue **(see St. John figure 2 box 225 output queue)**,
- a load monitor that monitors a loading condition of the transmit queue **(see paragraph 39 quantum value of a queue is updated)** by monitoring an amount of data residing within the transmit queue **(see paragraph 39 the packets in that queue may be serviced by first placing them in the output queue)**;
- a queue assignment module that stores a packet to one of a plurality of hold queues **(see paragraph 5 packets enqueue in the plurality of queues and figure 2 QoS 0 Queue)**, and transfers the packet from the one of the plurality of hold queues to a transmit queue **(see paragraph 30)** for delivery to a network device via a downstream channel in response to the time epoch **(see paragraph 8)**.

St. John discloses all the subject matter of the claimed invention with the exception of:

- generating a time epoch based on the loading condition by (i) computing a transmission time to deliver the amount of data in the transmit queue, (ii) computing a system load in units of time by comparing the transmission time to a constant lower limit and selectively setting the system load based on the comparison, and (iii) computing the time epoch based on the system load and a previous time epoch; and

Dan from the same or similar fields of endeavor teaches the use of:

- load timestamp is the server generated time stamp of the time at which the load was reported **(see Dan col. 3 lines 53-65)**,
- server utilization measured as the number o requests served per unit time **(see Dan col. 3 lines 53-65)**, and
- observed delay of the last response from that server, the delay timestamp containing the time at which the delay was observed **(see Dan col. 3 lines 53-65)**.
- Comparison of load timestamp from table U and table S and the server load in table S is set to the value of server load in table U **(see Dan col. 5 lines 7-14 as corresponds to comparing the transmission time to a constant lower limit and selectively setting the system load based on the comparison, since the term a constant lower**

limit is not further specified therefore it is broadly interpreted and in this case it is being compared with another table).

Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the generating timestamp as taught by Dan in the systems and computer program products for bandwidth allocation in a multiple access system of St. John in order to enhance system efficiency.

Regarding claim 61, St John teaches the queue assignment module associates the packet with a service flow **(see St. John paragraph 60)**, identifies a service credit associated with the service flow, wherein the service credit represents a bandwidth allocation available for consumption by the service flow, and assigns the packet to one of a plurality of hold queues based on the identified service credit **(see St. John paragraph 58 and 60)**.

Regarding claim 62, St John teaches the queue assignment module assigns an initial packet associated with the service flow to the transmit queue **(see St. John paragraph 30)**.

Regarding claim 63, St John teaches the queue assignment module further identifies a target queue state associated with the service flow, wherein the target queue state specifies a current priority level associated with the service flow, and selects one of the plurality of hold queues based on the target queue state **(see St. John paragraph 43)**.

Regarding claim 64, St John teaches the queue assignment module adjusts the target queue state by identifying a service class associated with the packet **(see St John paragraph 30)**, adjusting the service credit based on the

determined service class **(see St John paragraph 32)** and the loading condition monitored by the load monitor **(see St. John paragraph 49, 56, and 58)**, and selecting the different one of the plurality of hold queues based on the adjusted service credit and the adjusted target queue state **(see St. John paragraph 50 and 55)**.

Regarding claim 66, St John teaches the queue assignment module further compares the service credit to the size of the packet, and selectively assigns the packet to one of the plurality of hold queues based on the comparison **(see St. John paragraph 54 and 55)**.

Regarding claim 67, St John teaches the queue assignment module assigns the packet to one of the plurality of hold queues when the service credit is greater than or equal to the size of the packet **(see St. John paragraph 30)**.

Regarding claim 68, St John teaches the queue assignment module adjusts the service credit upon assigning the packet by subtracting the size of the packet from the service credit **(see St. John paragraph 51)**.

Regarding claim 69, St John teaches the queue assignment module compares the service credit to the size of the packet and selects a different one of the plurality of hold queues when the service credit is less than the size of the packet **(see St John paragraph 52 and figure 4 block 475)**.

Regarding claim 70, St John teaches the queue assignment module adjusts the service credit and selects a different one of the plurality of hold

queues based on the adjusted service credit **(see St John paragraph 49 and see figure 4 block 440, 460)**.

Regarding claim 71, St John teaches the queue assignment module adjusts the service credit by:

- defining a set of configurable service classes **(see St John paragraph 32)**,
- pre-computing service quanta for each service class in the set, wherein the service quantum represents a pre-computed bandwidth adjustment for different network loading conditions **(see St John paragraph 58)**,
- associating the packet with one of the service classes **(see St John paragraph 30)**,
- selecting one of the pre-computed service quanta based on the one of the service classes associated with the packet and a current network loading condition **(see St John paragraph 55-58)**, and
- adjusting the service credit based on the selected one of the pre-computed service quanta **(see St John paragraph 55-58)**.

Regarding claim 72, St John teaches the downstream scheduler further includes a queue transition module that assigns a queue state to each one of the plurality of hold queues, wherein the queue state represents a priority level for the respective hold queue **(see St John paragraph 30).**

Regarding claim 73, St John teaches the queue transition module further reassigns the queue state assigned to each one of the plurality of hold queues in response to the time epoch generated by the load monitor **(see paragraph 58 and 60)**.

Regarding claim 74, St. John teaches the queue transition module reassigns the queue state demoting the queue state of the highest priority one of the plurality of hole queues to the queue state of the lowest priority one of the plurality of hold queues **(see St. John paragraph 43 sets the QoS back to zero and begins a new service round)**, and promoting the queue states of the remaining hold queues by a priority level **(see St. John paragraph 43 if queue does not have any packets to send, QoS is set to QoS+1).**

Regarding claim 75, St John teaches the downstream scheduler transmits the packet via a downstream channel to the cable modem **(see St. John paragraphs 13, 26, and 29)**.

Regarding claims 76 and 77, St. John discloses methods, systems and computer program products for bandwidth allocation in a multiple access system **(see St. John paragraph 5)** program code **(see St. John paragraph 22)** comprising:

- A control unit **(see St. John paragraph 31)** that stores packets from a variable number of service flows to one of a static number of hold queues **(see St. John figure 2 QoS Queues)**
- storing a packet to one of a plurality of hold queues **(see paragraph 5 packets enqueue in the plurality of queues and figure 2 QoS 0 Queue)**;
- monitoring a loading condition of a transmit queue **(see paragraph 39 quantum value of a queue is updated)** by monitoring an amount of data residing within the transmit queue **(see paragraph 39 the packets in that queue may be serviced by first placing them in the output queue)**;
- transferring the packet from the one of the plurality of hold queues to a transmit queue **(see paragraph 30)** for delivery to a network device via a downstream channel in response to the time epoch **(see paragraph 8)**.

St. John discloses all the subject matter of the claimed invention with the exception of:

- generating a time epoch based on the loading condition by (i) computing a transmission time to deliver the amount of data in the transmit queue, (ii) computing a system load in units of time based on the transmission time, and (iii) computing the time epoch based on the system load and a previous time epoch; and

Dan from the same or similar fields of endeavor teaches the use of load timestamp is the server generated time stamp of the time at which the load was reported **(see Dan col. 3 lines 53-65)**, server utilization measured as the number o requests served per unit time **(see Dan col. 3 lines 53-65)**, and observed delay of the last response from that server, the delay timestamp containing the time at which the delay was observed **(see Dan col. 3 lines 53-65)**. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the generating timestamp as taught by Dan in the systems and computer program products for bandwidth allocation in a multiple access system of St. John in order to enhance system efficiency.

Regarding claim 78, St. John discloses methods, systems and computer program products for bandwidth allocation in a multiple access system **(see St. John paragraph 5)** program code **(see St. John paragraph 22)** comprising:

- a cable modem **(see St. John paragraph 13)**; and
- a cable modem termination system **(see St. John paragraph 13)** comprising:
- a downstream scheduler that includes a transmit queue **(see St. John figure 2 box 225 output queue)**,
- a load monitor that monitors a loading condition of the transmit queue **(see paragraph 39 quantum value of a queue is updated)** by monitoring an amount of data residing within the transmit queue **(see paragraph 39 the packets in that queue may be serviced by first placing them in the output queue)**;

- a queue assignment module that stores a packet to one of a plurality of hold queues **(see paragraph 5 packets enqueue in the plurality of queues and figure 2 QoS 0 Queue)**, and transfers the packet from the one of the plurality of hold queues to a transmit queue **(see paragraph 30)** for delivery to a network device via a downstream channel in response to the time epoch **(see paragraph 8)**.

St. John discloses all the subject matter of the claimed invention with the exception of:

- generating a time epoch based on the loading condition by (i) computing a transmission time to deliver the amount of data in the transmit queue, (ii) computing a system load in units of time based on the transmission time, and (iii) computing the time epoch based on the system load and a previous time epoch; and

Dan from the same or similar fields of endeavor teaches the use of load timestamp is the server generated time stamp of the time at which the load was reported **(see Dan col. 3 lines 53-65)**, server utilization measured as the number o requests served per unit time **(see Dan col. 3 lines 53-65)**, and observed delay of the last response from that server, the delay timestamp containing the time at which the delay was observed **(see Dan col. 3 lines 53-65)**. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the generating timestamp as taught by Dan in the systems and computer program products for bandwidth allocation in a multiple access system of St. John in order to enhance system efficiency.

5. Claims 20, 49, and 65 are rejected under 35 U.S.C. 103(a) as being unpatentable over St. John and Dan as applied to claims 1, 8, 11, 14, 17, 30, 37, 39, 43, 46, 54, 61, and 63 above, and further in view of the background of St. John.

Regarding claims 20, 49, and 65, St. John disclose all the subject matter of the claimed invention with the exception of the queue assignment module further compares the adjusted target queue state to a lowest priority level, and drops the packet when the adjusted target queue state is less than the lowest priority level.

The background of St. John from the same or similar fields of endeavor teaches the use of dropping low priority packets **(see St. John paragraph 4)**. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the dropping low priority packets as taught by the background of St. John in the methods, systems and computer program products for bandwidth allocation in a multiple access system of St. John in order to provide efficiency when the system is oversubscribed.

Response to Arguments

6. Applicant's arguments with respect to claims 1, 5-25, 28-30, 34-54, and 58-78 have been considered but are moot in view of the new ground(s) of rejection.

7. Applicant's arguments, see applicant's remark on page 17, filed 5/21/2008, with respect to 101 and 112 2nd of claims 25-29 have been fully

considered and are persuasive. The 101 and 112 2^{nd} of claims 25-29 has been withdrawn.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Sala et al. (SU2001/053152)

Kalkunte et al. (US2003/0128707)

Lam et al. (US6198724)

Van Der Zee et al. (US7177274)

Lyles et al. (US6563829)

Any inquiry concerning this communication or earlier communications from the examiner should be directed to WUTCHUNG CHU whose telephone number is (571)270-1411. The examiner can normally be reached on Monday - Friday 1000 - 1500EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edan Orgad can be reached on 571 272 7884. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/WC/
Wutchung Chu

/Edan Orgad/

Supervisory Patent Examiner, Art Unit 2619